Electronic Version
Stylesheet Version v1.1.1

Claims

[c1] 1. A method for determining future transmission frequencies of a frequency hopping signal comprising steps of:

a. receiving radio transmissions of the frequency hopping signal;

b. storing data pertaining to time of occurrence and center frequency for transmissions of the frequency hopping signal that have been received over time; and

c. deriving, based on the data, future transmission frequencies of the frequency hopping signal without obtaining state of a frequency hop sequence from information carried in the frequency hopping signal.

[c2] 2. The method of claim 1, wherein the step of receiving comprises receiving a subset of radio transmissions of the frequency hopping signal over time.

[c3] 3. The method of claim 1, wherein the step of deriving comprises deriving transmission frequencies for a subset of possible future transmissions of the frequency hopping signal.

[c4] 4. The method of claim 1, wherein the step of deriving

comprises deriving future transmissions frequencies of the frequency hopping signal that are selected by the frequency hop sequence that uses a pseudo-random mathematical process.

[c5] 5. The method of claim 4, wherein the step of deriving comprises steps of examining the data accumulated for radio transmissions of the frequency hopping signal received over time, solving for a partial solution of inputs to the pseudo-random mathematical process or for related values that are intermediate mathematical functions of the inputs, and using the partial solution or related values to compute transmission frequencies of the frequency hopping signal for at least a portion of a future time interval.

[c6] 6. The method of claim 5, wherein the step of solving comprises determining a portion of a plurality of input bits or related values thereof, wherein said portion of the plurality of input bits or related values thereof is determinative of transmission frequencies of the frequency hopping signal for at least a portion of the future time interval.

[c7] 7. The method of claim 6, wherein the step of solving is repeated based on further accumulated data to determine additional portions of the plurality of bits or related

values, thereby enabling computation of transmission frequencies of the frequency hopping signal for at least portions of additional future time intervals.

[c8] 8. The method of claim 6, wherein the step of solving comprises determining values for lower order clock bits that are determinative of transmission frequencies of the frequency hopping signal for at least a portion of a limited period of time corresponding to the future time interval.

[c9] 9. The method of claim 5, wherein the step of solving comprises solving for at least a partial solution to inputs or related values of the frequency hop sequence, and using the partial solution or related values to reduce a set of all possible transmissions frequencies for individual transmissions of the frequency hopping signal over at least a portion of the future time interval to a limited number of transmission frequencies.

[c10] 10. The method of claim 1, wherein steps (a) through (c) are performed in a first device, and further comprising the step of sending to a second device information to enable the second device to adjust an operating parameter to mitigate interference with the frequency hopping signal.

[c11] 11. The method of claim 5, wherein the step of receiving radio transmissions comprises receiving radio transmissions that are consistent with the Bluetooth communication standard.

[c12] 12. A method for mitigating interference with a frequency hopping signal, comprising steps of:
a. receiving radio transmissions of a frequency hopping signal;
b. deriving future transmission frequencies and times of the frequency hopping signal without obtaining state of a frequency hop sequence from information carried in the frequency hopping signal; and
c. adjusting an operating parameter of a communication device or network to mitigate interference with the frequency hopping signal using knowledge of future transmission frequencies and times of the frequency hopping signal.

[c13] 13. The method of claim 12, and further comprising the step of determining whether frequencies of possible future transmissions of the frequency hopping signal will occur within a particular frequency bandwidth.

[c14] 14. The method of claim 13, wherein the step of adjusting an operating parameter is performed during a time interval when a future transmission of the frequency

hopping signal may be expected to occur within the particular frequency bandwidth.

[c15] 15. The method of claim 13, wherein the step of adjusting an operating parameter is performed during a time interval when a future transmission of the frequency hopping signal will be known to occur within the particular frequency bandwidth.

[c16] 16. The method of claim 12, wherein the step of adjusting an operating parameter comprises adjusting one or more of: a time of transmission, a transmission frequency, a transmission data rate, a packet size for transmission, a transmission duration, a transmit power, a modulation scheme, and an encoding scheme.

[c17] 17. The method of claim 16, wherein the step of adjusting a time of transmission comprises advancing or delaying the transmission.

[c18] 18. The method of claim 12, wherein the step of deriving comprises deriving future transmissions frequencies of the frequency hopping signal that are selected by the frequency hop sequence that uses a pseudo-random mathematical process.

[c19] 19. The method of claim 18, wherein the step of deriving comprises steps of examining the data accumulated for

radio transmissions of the frequency hopping signal received over time, solving for a partial solution of inputs to the pseudo-random mathematical process or for related values that are intermediate mathematical functions of the inputs, and using the partial solution or related values to compute transmission frequencies of the frequency hopping signal for at least a portion of a future time interval.

[c20] 20. The method of claim 19, wherein the step of solving comprises determining a portion of a plurality of input bits or related values thereof, wherein said portion of the plurality of input bits or related values thereof is determinative of transmission frequencies of the frequency hopping signal for at least a portion of the future time interval.

[c21] 21. The method of claim 20, wherein the step of solving is repeated based on further accumulated data to determine additional portions of the plurality of bits or related values, thereby enabling computation of transmission frequencies of the frequency hopping signal for at least portions of additional future time intervals.

[c22] 22. The method of claim 20, wherein the step of solving comprises determining values for lower order clock bits that are determinative of transmission frequencies of the

frequency hopping signal for at least a portion of a limited period of time corresponding to the future time interval.

[c23] 23. The method of claim 19, wherein the step of solving comprises solving for at least a partial solution to inputs or related values of the frequency hop sequence, and using the partial solution or related values to reduce a set of all possible transmissions frequencies for individual transmissions of the frequency hopping signal over at least a portion of the future time interval to a limited number of transmission frequencies.

[c24] 24. The method of claim 12, wherein the step of adjusting is performed at a first device for a signal that the first device transmits to the second device.

[c25] 25. The method of claim 12, wherein the step of adjusting comprises adjusting a transmit time of a signal that the first device transmits to the second device so that a reply or acknowledgment signal transmitted by the second device to the first device does not interfere with the frequency hopping signal.

[c26] 26. The method of claim 12, wherein the step of adjusting is performed at a first device for a signal that the first device broadcasts to a plurality of other devices.

[c27] 27. The method of claim 12, wherein steps (a) and (b) are performed at a first device, and step (c) is performed at a second device.

[c28] 28. The method of claim 27, and further comprising the step of sending information from the first device to the second device to enable the second device to perform the step of adjusting.

[c29] 29. The method of claim 19, wherein the step of receiving radio transmissions comprises receiving radio transmissions that are consistent with the Bluetooth communication standard.

[c30] 30. The method of claim 12, wherein the step of adjusting comprises adjusting a parameter related to transmission of an IEEE 802.11 signal in a channel of a frequency band in which a future transmission of the frequency hopping signal may occur.

[c31] 31. A processor readable medium storing instructions that, when executed by a processor, cause the processor to perform steps of:
a. storing data pertaining to time of occurrence and center frequency for transmissions of the frequency hopping signal that have been received over time; and
b. deriving, based on the data, future transmissions fre-

quencies of the frequency hopping signal without obtaining state of a frequency hop sequence from information carried in the frequency hopping signal.

[c32] 32. The processor readable medium of claim 31, wherein the instructions for performing the step of storing comprise instructions for storing data for a subset of radio transmissions of the frequency hopping signal received over time.

[c33] 33. The processor readable medium of claim 31, wherein the instructions for performing the step of deriving comprise instructions for deriving transmission frequencies for a subset of possible future transmissions of the frequency hopping signal.

[c34] 34. The processor readable medium of claim 31, wherein the instructions for performing the step of deriving comprise instructions for deriving future transmission frequencies of the frequency hopping signal that are selected according to a pseudo-random mathematical process.

[c35] 35. The processor readable medium of claim 34, wherein the instructions for performing the step of deriving comprise instructions for performing steps of examining the data accumulated for radio transmissions of the fre-

quency hopping signal received over time, solving for a partial solution of inputs to the pseudo-random mathematical process or for related values that are intermediate mathematical functions of the inputs, and using the partial solution or related values to compute transmission frequencies of the frequency hopping signal for at least a portion of a future time interval.

[c36] 36. The processor readable medium of claim 35, wherein the instructions for performing the step of solving comprise instructions for determining a portion of a plurality of input bits or related values thereof, wherein said portion of the plurality of input bits or related values thereof is determinative of transmission frequencies of the frequency hopping signal for at least a portion of the future time interval.

[c37] 37. The processor readable medium of claim 35, and further comprising instructions for repeating the step of solving based on further accumulated data to determine additional portions of the plurality of bits or related values, thereby enabling computation of transmission frequencies of the frequency hopping signal for at least portions of additional future time intervals.

[c38] 38. The processor readable medium of claim 35, wherein the instructions for performing the step of solving com-

prise instructions for determining values for lower order clock bits that are determinative of transmission frequencies of the frequency hopping signal for at least a portion of a limited period of time corresponding to the future time interval.

[c39] 39. The processor readable medium of claim 35, wherein the instructions for performing the step of solving comprise instructions for solving for at least a partial solution to inputs or related values of the frequency hop sequence, and using the partial solution or related values to reduce a set of all possible transmissions frequencies for individual transmissions of the frequency hopping signal over at least a portion of the future time interval to a limited number of transmission frequencies.

[c40] 40. The processor readable medium of claim 31, and further comprising instructions, that when executed by the processor, cause the processor to adjust an operating parameter of a communication device or network to mitigate interference with the frequency hopping signal.

[c41] 41. The processor readable medium of claim 40, and further comprising instructions stored on the medium, that when executed by the processor, cause the processor to perform a step of determining whether frequencies of possible future transmissions of the frequency

hopping signal will occur within a particular frequency bandwidth.

[c42] 42. The processor readable medium of claim 41, wherein the instructions for performing the step of adjusting are executed during a time interval when a future transmission of the frequency hopping signal may be expected occur within the particular frequency bandwidth.

[c43] 43. The processor readable medium of claim 41, and further comprising instructions stored on the medium, that when executed by the processor cause the processor to execute the step of adjusting an operating parameter during a time interval when a future transmission of the frequency hopping signal will be known to occur within the particular frequency bandwidth.

[c44] 44. The processor readable medium of claim 40, wherein the instructions for performing the step adjusting comprise instructions for adjusting one or more of: a time of transmission, a transmission frequency, a transmission data rate, a packet size for transmission, a transmission duration, a transmit power, a modulation scheme, and an encoding scheme.

[c45] 45. A radio device comprising the processor readable medium of claim 31, and further comprising a processor

that executes the instructions stored on the processor readable medium, and a radio receiver that receives radio transmissions of the frequency hopping signal and outputs a receive signal from which is obtained the data pertaining to time of occurrence and center frequency of transmissions of the frequency hopping signal.